

Seminar series on Food Safety in Asia-Pacific
“Emerging topics in our food environment”
Webinar #2 “Understanding allergy of livestock products”

Livestock products such as eggs and milk are rich in nutrients, but they are also the leading causes of food allergies. Research on the mechanism of food allergy has progressed rapidly in recent years, and the unique mechanisms underlying allergy caused by egg, milk and meat are being elucidated. The World Organisation for Animal Health (WOAH) Collaborating Centre for Food Safety (a consortium since 2014 of the School of Veterinary Medicine, Rakuno Gakuen University; Research Center for Food Safety, University of Tokyo; and the National Centre for Food Science, Singapore Food Agency) organised a webinar on **“Understanding allergy of livestock products”**, with support from WOA regional and sub-regional offices in Asia and the Pacific. According to the Zoom record, 65 participants from 18 countries/territories (Afghanistan, Bhutan, Canada, Fiji, Hong Kong SAR, Indonesia, Iran, Japan, Malaysia, Maldives, Philippines, Saudi Arabia, Singapore, Sri Lanka, C. Taipei, Thailand, Timor-Leste, Turkey) participated. Questions for the speakers were collected via the registration form as well as via zoom chat and were responded by the speakers during the discussion section. This was the second seminar in a regional webinar series on various emerging topics related to food safety, based on the expertise of the three organisations.

Date: October 25 14-16 JST

Program

	Programme	Speaker
14:00-14:15 (JST)	Welcome & Introduction <ul style="list-style-type: none">• Housekeeping• Introduction of FS CC Consortium and the webinar series	RRAP and Prof Kazuhiro Hirayama (Director, RCFS, Univ. Tokyo)
14:15-14:45	Lecture 1: Food allergy caused by livestock products.	Prof Naoki Shimojo (Center for Preventive Medical Sciences, Chiba Univ.)

14:45-15:05	Lecture 2: Approaches to control allergenicity through food and nutritional measures	Prof Satoshi Hachimura (RCFS, Univ. Tokyo)
15:05-15:20	Lecture 3: Approaches to control allergenicity through animal biotechnology	Assoc Prof Shigeru Kakuta (Dept. Veterinary Medical Sciences and RCFS, Univ. Tokyo)
15:20-15:45	Discussion	Moderated by Satoshi Hachimura
15:45-16:00	Wrap-up Introduction of next Webinar	RRAP Prof Makita?

Presentation summary

Food allergy caused by livestock products.

Dr. Shimojo first gave an overview on food allergy. He explained that percutaneous sensitization is thought to be one of the major routes for sensitization and IgE-mediated food allergy and that IgE-mediated food allergy could be prevented by combination of early introduction of food and treatment of atopic dermatitis. Then, Dr. Shimojo introduced in detail about individual allergy caused by livestock products. He mentioned that egg and milk are leading foods that cause allergy in various countries. He showed that unexpected sensitization to livestock products may occur via skin, and that cross-reactivities between foods and other proteins may cause food allergy.

Approaches to control allergenicity through food and nutritional measures

Dr. Hachimura talked about approaches to control allergy through food and nutritional measures. He first highlighted the intestinal immune system, which serves as the interface between food and the immune system. Then he explained that food was able to modulate immune and allergic responses. Dr. Hachimura showed in detail that early introduction of food allergens such as egg may prevent allergy, and that food components like ω 3 fatty acids or lactic acid bacteria could suppress food allergy. He then introduced studies of his group that demonstrated a functional protein preparation from milk alleviated food allergy in a mouse model. Finally, he showed that diet diversity may reduce risk of food allergy.

Approaches to control allergenicity through animal biotechnology

Dr. Kakuta introduced approaches to control allergenicity through animal biotechnology. Various genetically modified domestic animals including pigs, cattle and chickens, had been generated by current genetic engineering techniques. *GGTA1* deficient pigs, which lack galactose- α -1,3-galactose

(α -Gal) sugar molecule, for potentially allergy-free meat were established. FDA approved *GGTA1* deficient pigs (facility in northern Iowa) for human food in 2021, but not yet commercially available. Exogenous gene integration-free *GGTA1* deficient cattle, major egg allergen ovomucoid (*OVM*) deficient chickens were generated, and these are thought as domestic animals for potentially allergy-free food.